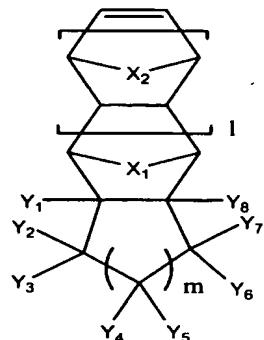


**What is claimed is:**

1. A photoresist monomer represented by following Formula 1:

Formula 1



5

wherein, X<sub>1</sub> and X<sub>2</sub> individually are selected from the group consisting of (C<sub>1</sub>-C<sub>10</sub>)alkylene, O and S;

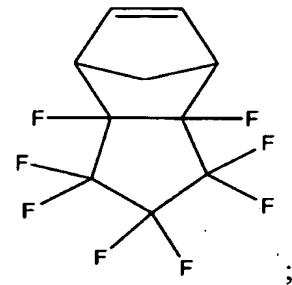
10 Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>4</sub>, Y<sub>5</sub>, Y<sub>6</sub>, Y<sub>7</sub> and Y<sub>8</sub> individually are selected from the group consisting of halogen, and an alkyl partially substituted with halogen and an alkyl completely substituted with a halogen; and

l and m are individually integers ranging from 0 to 3.

15 2. The photoresist monomer according to claim 1, wherein the Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>4</sub>, Y<sub>5</sub>, Y<sub>6</sub>, Y<sub>7</sub> and Y<sub>8</sub> are individually selected from the group consisting of F, Cl, Br, I and CF<sub>3</sub>.

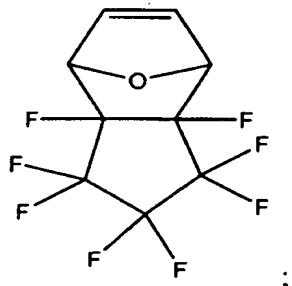
3. The photoresist monomer according to claim 1, wherein the monomer of Formula 1 is selected from the group consisting of compounds of the Formulas 1a to 1d :

Formula 1a

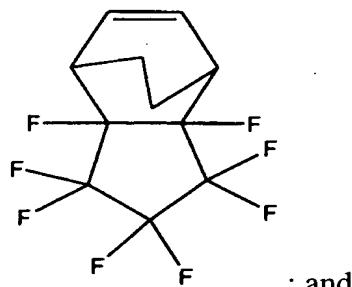


5

Formula 1b



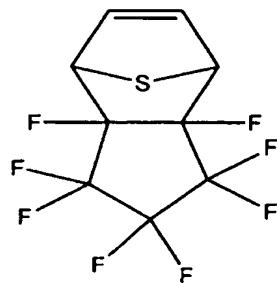
Formula 1c



; and

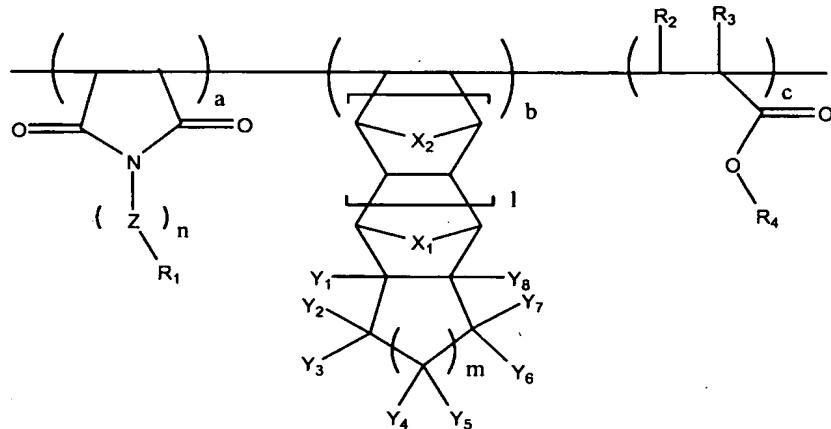
10

Formula 1d



4. A photoresist polymer comprising a repeating unit of the following  
Formula 4:

Formula 4



5 wherein,  $R_1$ ,  $R_2$  and  $R_3$  individually are selected from the group consisting of H, halogen, ( $C_1-C_{20}$ ) alkyl, ( $C_1-C_{20}$ ) alkyl with halogen substituent(s); ( $C_1-C_{20}$ ) alkyl containing an ether group (-O-); and ( $C_1-C_{20}$ ) alkyl with halogen substituent(s) and containing an ether group;

10  $R_4$  is an acid labile protecting group;

$X_1$  and  $X_2$  individually are selected from the group consisting of ( $C_1-C_{10}$ )alkylene, O and S;

15  $Y_1$ ,  $Y_2$ ,  $Y_3$ ,  $Y_4$ ,  $Y_5$ ,  $Y_6$ ,  $Y_7$  and  $Y_8$  individually are selected from the group consisting of halogen, an alkyl partially substituted with halogen and an alkyl completely substituted with a halogen;

$Z$  is O or S;

20  $l$  and  $m$  are individually integers ranging from 0 to 3;

$n$  is 0 or 1; and

the ratio  $a : b : c$  falls within the ranges 0-60mol% : 5-80mol% : 0-90mol%.

25

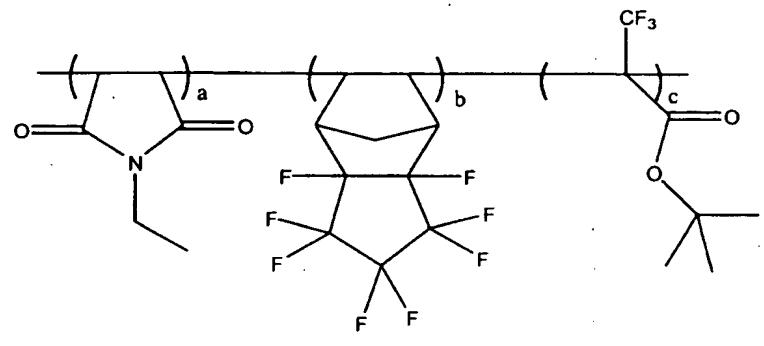
5. The photoresist polymer according to claim 4, wherein the  $R_1$ ,  $R_2$  and  $R_3$  are individually selected from the group consisting of H, F, ( $C_1-C_{20}$ ) alkyl, ( $C_1-C_{20}$ ) perfluoroalkyl, ( $C_1-C_{20}$ ) alkyl containing an ether group, ( $C_1-C_{20}$ ) perfluoroalkyl containing an ether group, ( $C_1-C_{20}$ ) alkyl partially substituted with F, and ( $C_1-C_{20}$ ) alkyl partially substituted with F and containing an ether group.

6. The photoresist polymer according to claim 4, wherein the acid labile protecting group is selected from the group consisting of tert-butyl, tetrahydropyran-2-yl, 2-methyl tetrahydropyran-2-yl, tetrahydrofuran-2-yl, 2-methyl tetrahydrofuran-2-yl, 1-methoxypropyl, 1-methoxy-1-methylethyl, 1-ethoxypropyl, 1-ethoxy-1-methylethyl, 1-methoxyethyl, 1-ethoxyethyl, tert-butoxyethyl, 1-isobutoxyethyl and 2-acetylmenth-1-yl.

5  
7. The photoresist polymer according to claim 4, wherein the repeating unit of the Formula 4 is selected from the group consisting of Formulas 4a to 4d:

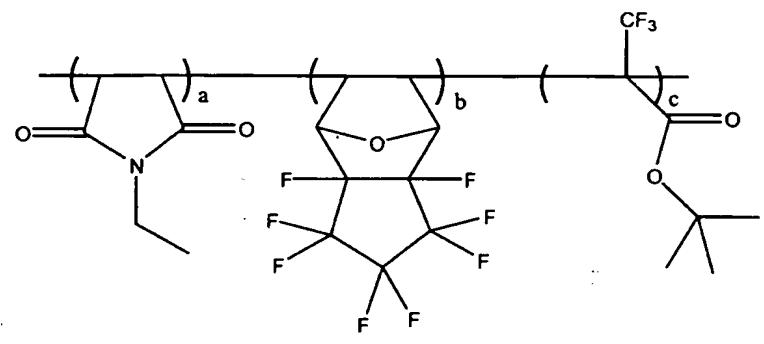
10

Formula 4a



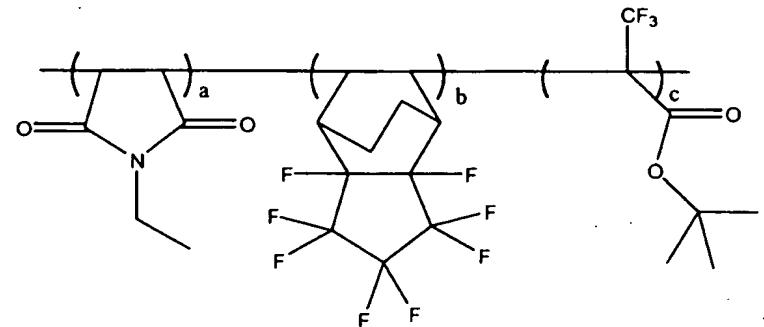
;

Formula 4b



;

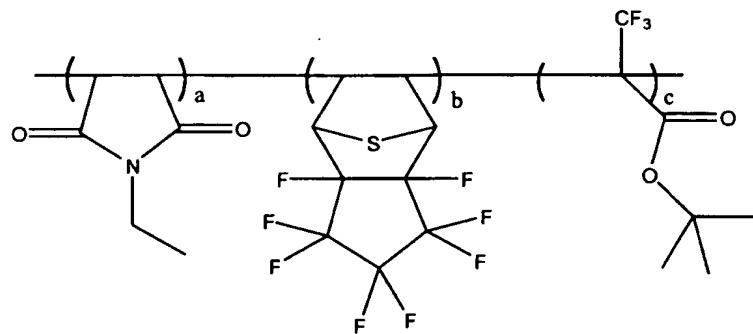
Formula 4c



; and

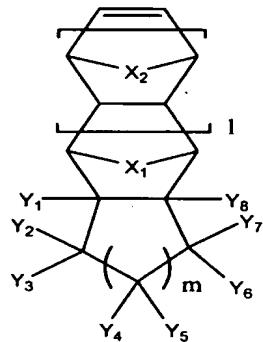
15

Formula 4d



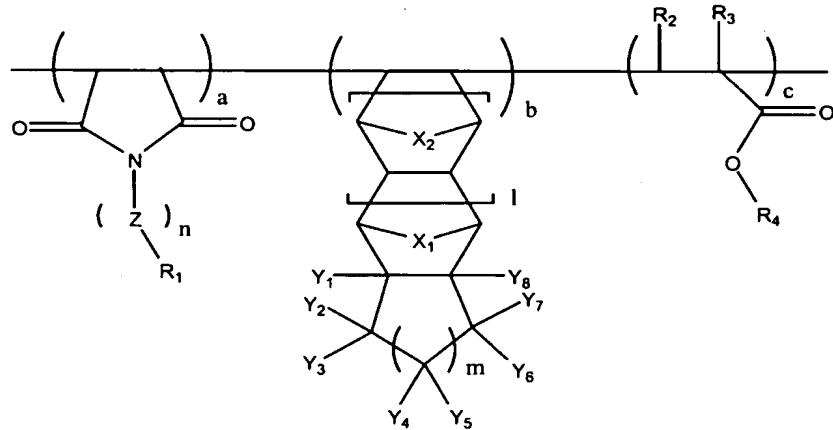
8. A process of preparing of a photoresist polymer comprising:  
5 (a) admixing (i) a compound of Formula 1 and optionally (ii) at least one of the compound of Formula 5 and the compound of Formula 6; and  
(b) adding a polymerization initiator into the resultant of step (a) to obtain a repeating unit of Formula 4:

Formula 1

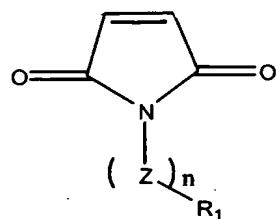


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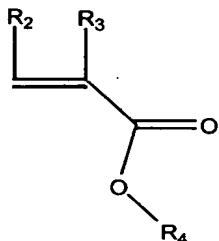
Formula 4



Formula 5



Formula 6



5 wherein, R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> individually are selected from the group consisting of H, halogen, (C<sub>1</sub>-C<sub>20</sub>) alkyl, (C<sub>1</sub>-C<sub>20</sub>) alkyl with halogen substituent(s), (C<sub>1</sub>-C<sub>20</sub>) alkyl containing an ether group, and (C<sub>1</sub>-C<sub>20</sub>) alkyl with halogen substituent(s) and containing an ether group;

R<sub>4</sub> is an acid labile protecting group;

10 X<sub>1</sub> and X<sub>2</sub> individually are selected from the group consisting of (C<sub>1</sub>-C<sub>10</sub>)alkylene, O and S;

Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>4</sub>, Y<sub>5</sub>, Y<sub>6</sub>, Y<sub>7</sub> and Y<sub>8</sub> individually are selected from the group consisting of halogen, an alkyl partially substituted with halogen and an alkyl completely substituted with a halogen;

15 Z is O or S;

l and m are individually integers ranging from 0 to 3;

n is 0 or 1; and

the ratio a : b : c falls within the ranges 0-60mol% : 5-80mol% : 0-90mol%.

20

9. The process according to claim 8, wherein the step (a) is carried out in a polymerization solvent selected from the group consisting of cyclohexanone, cyclopentanone, tetrahydrofuran, dimethylformamide, dimethylsulfoxide, dioxane, methylmethylethylketone, benzene, toluene, xylene and mixtures thereof.

10. The process according to claim 8, wherein the polymerization initiator is selected from the group consisting of 2,2'-azobisisobutyronitrile(AIBN), benzoylperoxide, acetylperoxide, laurylperoxide, tert-butylperoxide and di-tert-butyl peroxide.

5

11. A photoresist composition comprising:

- (i) the photoresist polymer of claim 4;
- (ii) an organic solvent; and
- (iii) a photoacid generator.

10

12. The photoresist composition according to claim 11, wherein the photoacid generator is selected from the group consisting of phthalimidotrifluoromethane sulfonate, dinitrobenzyltosylate, n-decyl disulfone and naphthylimido trifluoromethane sulfonate.

15

13. The photoresist composition according to claim 12, wherein the photoacid generator further comprises a compound selected from the group consisting of diphenyl iodide hexafluorophosphate, diphenyl iodide hexafluoroarsenate, diphenyl iodide hexafluoroantimonate, diphenyl p-methoxyphenylsulfonium triflate, diphenyl p-toluenylsulfonium triflate, diphenyl p-isobutylphenylsulfonium triflate, diphenyl p-tert-butylphenylsulfonium triflate, triphenylsulfonium hexafluorophosphate, triphenylsulfonium hexafluoroarsenate, triphenylsulfonium hexafluoroantimonate, triphenylsulfonium triflate, dibutylnaphthylsulfonium triflate and mixtures thereof.

25

14. The photoresist composition according to claim 11, wherein the photoacid generator is present in an amount ranging from about 0.05 to about 10% by weight of the photoresist polymer.

30

15. The photoresist composition according to claim 11, wherein the organic solvent is selected from the group consisting of methyl 3-methoxypropionate, ethyl 3-ethoxypropionate, propylene glycol methyl ether acetate, cyclohexanone, 2-heptanone, ethyl lactate and mixtures thereof.

16. The photoresist composition according to claim 11, wherein the organic solvent is present in an amount ranging from about 500 to about 2000% by weight of the photoresist polymer.

5        17. A process for forming a photoresist pattern, comprising:  
coating a photoresist composition of claim 11 on a substrate to form a photoresist film;  
exposing the photoresist film to light; and  
developing the exposed photoresist film to obtain a photoresist pattern.

10        18. The process according to claim 17, further comprising a soft baking step before step (b) and/or a post baking step after step (b).

15        19. The process according to claim 18, wherein the soft and post baking steps are individually performed at a temperature ranging from about 70 to about 200°C.

20        20. The process according to claim 17, wherein the sources of the light is selected from the group consisting of VUV, ArF, KrF, E-beam, EUV and ion beam.

21. The process according to claim 17, wherein the irradiation energy of the step (b) is in the range of from about 1mJ/cm<sup>2</sup> to about 100 mJ/cm<sup>2</sup>.

25        22. The process according to claim 17, wherein the step (c) is performed in alkaline developing solution.

23. A semiconductor element manufactured according to the process of claim 17.